

MYSTERY VOICES



They bark, peep, croak, quack, twang, trill, whistle, chirp, click, oink, snore, bleat, chuckle, grunt . . . and ribbit. And that's just the tip of the vocal iceberg for frogs.

Spring through summer, the rhythm of frog songs gives the night an audible pulse. Actually, what we hear are male frogs crooning for a mate, or telling other male frogs to keep away from their breeding ground. The range and variety of frog song is impressive, but what seems almost unbelievable is the volume.

Big Noises from Tiny Critters

Ever wonder how such tiny critters can make such loud noises? Many male frogs have a vocal sac—an expandable pouch full of elastic fibers—connected to the chin, beneath the floor of the mouth. (Some species have a sac on each side of the head.) The sac balloons out during vocalization. Does this mean, then, that the vocal sac is associated in some way with producing frog sound? No. A frog's vocal sac acts as a resonator for sound waves, meaning that the sac intensifies the sound that is first produced in the frog's vocal cords. The resonator (a frog's vocal sac) improves the ability of the frog to transmit sound in much the same way the wooden body of a guitar intensifies the sound created by its vibrating strings.

From Clicks to Trills

Frog calls range in duration from simple, brief clicks of 5 to 10 milliseconds to trills of several minutes. A long call is sustained by air being pushed back and forth across the larynx between the lungs and the vocal sac—in a manner similar to the way a bagpipe is played.

Here's how it works:

To vocalize, the frog first inflates its lungs, then expels the air through its larynx. The air rushes past the larynx and into the mouth, which the frog keeps closed. The air exits through tiny openings on the floor of the frog's mouth that lead into the vocal sac, causing it to expand. When the expansion reaches a certain level, the sac contracts due to the elastic properties of the tissue. The contraction pushes the air out through the larynx and into the lungs . . . which re-inflate. This cycle can continue with very little energy input because both structures, the sacs and the lungs, are highly elastic.

Spring peepers have one of the largest vocal-sac-to-body volume ratios of any of the frog species. The vocal sac is almost the same size as the peeper's body. It is part of a system that allows the frog to make repeated vocalizations without expending much energy. One peeper can repeat its call as often as 4,000 times per hour. Jeepers!